Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) A unitary subcutaneous implantable cardioverter-defibrillator comprising:

(A) a long thin housing with [[a]] first and second ends that is curved in a shape of a patient's rib wherein the housing contains a source of electrical energy, a capacitor, and operational circuitry that senses the presence of potentially fatal heart rhythms;

(B) cardioversion/defibrillation electrodes located at the ends of the housing;

(C) means for delivering electrical cardioversion-defibrillation energy from about 3 volts to about 2000 volts, said means configured to deliver said electrical cardioversion-defibrillation energy when the operational circuitry senses a potentially fatal heart rhythm; and

(D) the absence of a transvenous, intracardiac, epicardial, or subcutaneous electrode.

2-37. (cancelled)

38. (currently amended) A unitary cardioverter-defibrillator for subcutaneous implantation, comprising:

a canister comprising a biocompatible housing enclosing and containing cardioversion-defibrillation circuitry, said housing having first and second ends, wherein the first end is thicker than the second end ~~a downward taper continuously formed along at least one exterior periphery of the biocompatible housing~~; and

a pair of electrodes formed on opposite ends of the biocompatible housing and electrically interfaced to the cardioversion-defibrillation circuitry to deliver an electrical therapy to the heart of a patient; wherein said cardioversion-defibrillation circuitry is configured to deliver a low voltage of about 3 volts.

39. (cancelled)

40. (currently amended) A unitary subcutaneous cardioverter-defibrillator with an electrically active canister for minimally invasive implantation, comprising:

a subcutaneously implantable canister comprising a sterilizable biocompatible housing enclosing and containing cardioversion-defibrillation circuitry interfaceable through the biocompatible housing, the biocompatible housing formed into a partially curved surface along a longitudinal axis, ~~with a downward taper continuously formed along an exterior periphery of the biocompatible housing, and a pair of semi-converging tapers continuously formed about opposite sides of the downward taper~~; and

a pair of electrodes formed on opposite and facing ends of the biocompatible housing, said electrodes being spaced apart along the longitudinal axis and electrically interfaced via one or more internal conductors to the cardioversion-defibrillation circuitry, said pair of electrodes configured to deliver an electrical therapy to the heart of a patient therebetween.

41. (cancelled)

42. (currently amended) A unitary cardioversion-defibrillation device with an electrically conductive housing [[means]] for subcutaneous implantation, comprising:

~~means for~~ a hermetically sealed housing ~~and hermetically~~ containing cardioversion-defibrillation circuitry, the housing ~~means defining a~~ being curved along a longitudinal axis and having a substantially electrically insulated outer surface~~, with a downward taper continuously formed along an exterior periphery of the housing means, and a pair of semi-converging tapers continuously formed about opposite sides of the downward taper~~; and

~~means for delivering an electrical therapy from~~ first and second electrodes disposed on opposite and facing ends of the housing, the cardioversion-defibrillation circuitry being ~~means~~ responsive to an autonomously detected arrhythmic condition, the ~~electrical therapy delivering means~~ electrodes being electrically connected via one or more internal conductors to the cardioversion-defibrillation circuitry.

43. (cancelled)

44. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator with an electrically active canister, comprising:

an implantable canister providing a curved housing enclosing and containing cardioversion-defibrillation circuitry and sense circuitry, the housing being curved along a longitudinal axis; and

~~a pair of~~ at least three electrodes formed on the housing, wherein first and second electrodes are disposed on opposite and facing ends of the housing and are electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry, the cardioversion-defibrillation circuitry configured to deliver an electrical therapy via the first and second electrodes to the heart of a patient responsive to an autonomously detected arrhythmic condition, wherein at least a third electrode is disposed on the housing and is configured to sense an electrical characteristic of a patient, wherein the sense circuitry and cardioversion-defibrillation circuitry are programmable.

45. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator according to ~~Claim~~ claim 44, further comprising;

a removable core operational member containing the cardioversion-defibrillation circuitry separate and interchangeably from the housing and providing a plurality of connectors; and

the housing operationally disposed to receive the core operational member via a plurality of matching connectors.

46. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator for providing anti-arrhythmia therapy, comprising:

an implantable canister providing a curved housing enclosing and containing cardioversion-defibrillation circuitry; and

a pair of electrodes formed on opposite and facing ends of the housing and electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry to deliver an anti-arrhythmic waveform between the pair of electrodes to a heart of a patient responsive to an arrhythmic condition autonomously detected by the cardioversion-defibrillation circuitry,

wherein the cardioversion-defibrillation circuitry and electrodes are configured to deliver a waveform of from about 3 volts to about 2000 volts.

47. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator according to ~~Claim~~ claim 46, wherein the pair of electrodes are configured to deliver the anti-arrhythmia ~~biphasic~~ waveform as a biphasic waveform with [[has]] characteristics comprising at least one of a capacitance between approximately 50 μF and 200 μF, voltage between approximately 800 V and 2000 V J energy between 40 J and 150 J, and a duration between approximately 5 msec to 25msec.

48. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator for monitoring cardiac physiological conditions, comprising:

an implantable canister providing a curved housing and containing cardioversion-defibrillation circuitry;

a pair of electrodes formed on opposite and facing ends of the housing and electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry to deliver an electrical therapy to the heart of a patient responsive to an autonomously detected arrhythmic condition; and

monitoring circuitry integral to the cardioversion-defibrillation circuitry and deriving cardiac physiological measures relating to at least one of QRS signal morphology, QRS signal frequency content, QRS R-R interval stability data, and QRS amplitude characteristics, wherein the monitoring circuitry is further configured to measure respiration.

49. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator for providing cardiac pacing, comprising:

an implantable canister providing a long thin curved housing enclosing and containing cardioversion-defibrillation circuitry;

a pair of electrodes formed on opposite and facing ends of the housing and electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry to deliver an

electrical therapy to the heart of a patient responsive to an autonomously detected arrhythmic condition; and

pacing circuitry operatively conjunctive to the cardioversion-defibrillation circuitry which generates at least one of an anti-bradycardia and an anti-tachycardia pacing waveform via the ~~electrically conductive surface~~ pair of electrodes responsive to the cardioversion-defibrillation circuitry.

50. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator inducing cardiac fibrillating episodes, comprising:

an implantable canister providing a ~~curved~~ housing enclosing and containing cardioversion-defibrillation circuitry, the housing being curved along a longitudinal axis, the housing having first and second ends, the first end being thicker than the second end;

a pair of electrodes formed on opposite and facing ends of the housing and electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry to deliver an electrical therapy to the heart of a patient responsive to an autonomously detected arrhythmic condition; and

induction circuitry integral to the cardioversion-defibrillation circuitry which generates low amplitude voltage on a T-wave of an ECG via the ~~electrically conductive surface~~ pair of electrodes responsive to the cardioversion-defibrillation circuitry.

51. (currently amended) An implantable unitary subcutaneous cardioverter-defibrillator detecting cardiopulmonary physiological conditions, comprising:

an implantable canister providing a curved housing enclosing and containing cardioversion-defibrillation circuitry;

a pair of electrodes formed on opposite and facing ends of the housing and electrically interfaced via one or more conductors to the cardioversion-defibrillation circuitry to deliver an electrical therapy to the heart of a patient responsive to an autonomously detected arrhythmic condition; and

detection circuitry integral to the cardioversion-defibrillation circuitry and deriving physiological measures relating to at least one of atrial fibrillation, ventricular fibrillation,

transthoracic impedance, respiratory rate, heart rate, cardiac output, ECG shape and temperature, wherein the detection circuitry and cardioversion-defibrillation circuitry are programmable to adapt the electrical therapy in response to the physiological measures.

52. (withdrawn) An apparatus for implanting a unitary subcutaneous cardioverter-defibrillator, further comprising :

a curved trocar comprising a tubular cannula defining a central lumen along an axial length and affixed to a proximal handle, the tubular cannula having a tapered distal end styled to dissect a subcutaneous path within a patient.